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## Injury threshold: Whiplash-associated disorders

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### Abstract

**Objectives:** To review current knowledge and recent concepts of the causes of injuries after minor impact automobile collisions and to acquaint those who treat these types of injuries with possible injury thresholds and mechanisms that may contribute to symptoms. **Data Sources:** A review of literature involving mechanisms of injury, tissue tensile threshold, and neurologic considerations was undertaken. A hand-search of relevant engineering, medical/chiropractic, and computer *Index Medicus* sources in disciplines that cover the variety of symptoms was gathered. **Results:** Soft-tissue injuries are difficult to diagnose or quantify. There is not one specific injury mechanism or threshold of injury. With physical variations of tissue tensile strength, anatomic differences, and neurophysiologic considerations, such threshold designation is not possible. **Conclusions:** To make a competent assessment of injury, it is important to evaluate each patient individually. The same collision may cause injury to some individuals and leave others unaffected. With the variability of human postures, tensile strength of the ligaments between individuals, body positions in the vehicle, collagen fibers in the same specimen segment, the amount of muscle activation and inhibition of muscles, the size of the spinal canals, and the excitability of the nervous system, one specific threshold is not possible. How individuals react to a stimulus varies widely, and it is evident peripheral stimulation has effects on the central nervous system. It is also clear that the somatosensory system of the neck, in addition to signaling nociception, may influence the control of neck, eyes, limbs, respiratory muscles, and some preganglionic sympathetic nerves. (*J Manipulative Physiol Ther* 2000;23:420-7)

**Keywords:** [Whiplash Injury](#), [Cervical Vertebrae](#), [Spine](#), [Central Nervous System](#)

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